Mountaintop Mining/Valley Fill Environmental Impact Statement
Technical Study

WORK PLAN APPROACH FOR PROJECTING FUTURE COAL MINING IN STEEP TERRAIN OF APPALACHIA

November 12, 1999

I. Problem Statement

Coal extraction by surface mining in the steep terrain of in Appalachia, primarily southern West Virginia, eastern Kentucky, and western Virginia, has resulted in placement of excess spoil into valleys adjacent to the actual mining site. While this practice is recognized and allowed under the Surface Mining Control and Reclamation Act of 1977 (SMCRA), the increased size and frequency of the excess spoil valley fills in recent years has raised various environmental and safety concerns. In order to assess the possible impacts of future valley fills in the steep terrain of Appalachia, the extent and distribution of remaining surface minable coal resources must be considered.

The vintage and quality of existing coal resource information varies markedly in West Virginia, Kentucky, and Virginia. All three states are updating and are in the process of mapping and quantifying existing coal resources within geographic information systems (GIS). These state projects are at various stages of completion, but under current plans, none of the projects will be fully completed in time for assimilation into the mountaintop mining / valley fill environmental impact statement (EIS).

This work plan was developed in cooperation with the state agencies and others working to quantify coal resources in West Virginia, Kentucky, and Virginia. The overall purpose of the proposal is to expedite the identification of the extent and distribution of surface minable coal resources in the steep terrain of Appalachia so that this information is available for the EIS.

II. Goals and Questions to be Addressed by This Work Plan

The steering committee for the EIS has adopted goals and questions to be addressed from several different perspectives: environmental, regulatory, and public service. This work plan, in conjunction with the other work plans and technical symposia that will be conducted during the preparation of the EIS, will attempt to address the following goals as adopted by the committee:

- What are the cumulative short- and long-term effects of mountaintop mining operations and associated valley fills? The answer to this question should include a complete inventory of expected future stream and terrestrial area effects (i.e., miles of streams and square miles of terrestrial habitat impacted/lost).

- What are projections for the extent of mountaintop mining in the Appalachian coalfields in the future.

III. EIS Team Members and Experts Consulted

Point of Contact: Michael Robinson, OSM Appalachian Regional Coordinating Center, Pittsburgh, PA, (412) 937-2882, mrobinso@osmre.gov

Team Members: Charles Sturey and Doug Brown (West Virginia Division of Environmental Protection); Michael Robinson, Dr. Kewal Kohli, Thomas Mastrorocco and David Hartos (Office of Surface Mining)

Experts Consulted: Nick Fedorko and Mitch Blake (West Virginia Geologic and Economic Survey); Les Vincent (Virginia Department of Mines, Minerals and Energy); Jerry Weissenfluh (Kentucky Geological Survey); Paul Rothman and John Mark Clements (Kentucky Natural Resources and Environmental Protection Cabinet); Jingles Ruppert, Ron Stanton, and Blaine Cecil (US Geological Survey); John Morgan (Morgan Worldwide Mining); Hill & Associates; Eric C. Westman, (Virginia Polytechnic Institute and State University), and David Massey (Coal Outlook).

IV. Study Approach

Task 1: *Assemble all available literature and other sources of information on coal resource in West Virginia, Kentucky, and Virginia*

Geologic information, coal resource estimates, and coal mining projections exist of varying vintages. West Virginia Geologic and Economic Survey, Kentucky Geologic Survey, Virginia Department of Mines, Minerals and Energy, U.S. Geological Survey, and U.S. Department of Energy, Energy Information Agency will provide appropriate information and analyses.

Information is also available from private sources such as the *Keystone Coal Manual*, and from private consultants such as Hill & Associates. Various coal industry organizations, such as, but not necessarily limited to, the National Mining Association, West Virginia Coal Association, West Virginia Mining & Reclamation Association, as well as individual mining companies may provide additional data.

Virginia Tech has recently completed an estimation of coal reserves/resources for Virginia. This information will hopefully be available to OSM via GIS. The West Virginia GES and VPI Virginia GIS data will be used to cross-check the industry-supplied reserve/resource data discussed below.

John E. Feddock (Marshall Miller & Associates) provided reserve/resource impact study in West Virginia for the National Council of Coal Lessors, Inc. (NCCL) and the Western Pocahontas

Properties Limited Partnership (WPP). In addition to providing reserve/resource information for two mining complexes in West Virginia, the study portray the impacts of restricting mountaintop removal mining.

Task 2: *West Virginia Geology GIS Method–Macro Method*

The West Virginia Geologic and Economic Survey (WVGES) is currently engaged in an extensive project to develop a coal resource GIS for all of West Virginia. This project is proposed to be completed in 3-5 years, which is well beyond the time frame to complete the EIS. In order to deliver a useful product for the EIS effort, WVGES developed the following proposal.

To accomplish the objectives of the EIS, geologic and past/current mining information is needed to identify coal reserves in steep slopes likely to be mined by surface mining methods. The WVGES method begins with identification of the areas within steep-slope West Virginia containing the geologic interval with the highest probability of surface coal mining (Primary MTRM Region). This is to be accomplished by mapping the outcrop of the base of the Coalburg coal zone, the lowest bed in the target interval, for the 7.5-minute quadrangles within the Primary MTRM Region. The outcrop for the next most important bed in the target interval, the overlying No. 5 Block coal bed will be added as time allows. The second step will entail compiling past and current surface and underground mined areas.

Sources for the surface mined areas will include: 1) the published 1:24,000 quadrangle maps; 2) the permit mapping effort of the WVDEP; 3) and the 1996-97 NAPP photography. The source for the underground mined areas will be the previous 1:24,000 scale compilations by WVGES. For expediency, mined areas will be highly generalized, unless already in a detailed, digital format. What will remain of the Primary MTRM Region will be unmined areas. Last, WVGES geologists will utilize a *reconnaissance* net coal thickness map to identify areas of thin coal within the unmined area, further eliminating the area attractive to mountaintop removal mining. This process will not involve creating overburden-to-coal ratio maps. The result of this multi-step process will be a map of the Primary MTRM region showing the outcrops of the two principle beds, the areas already mined and permitted, and the thin coal areas delimited. What will remain will be remaining resource areas *more likely* to be attractive to mountaintop mining. The industry data in Task 4, below will be used to refine this effort. All of the map products will be produced in Arcinfo format in UTM zone 17 projection.

Task 3: *West Virginia Geology GIS Method–Micro Method*

As a complement to WVGES "macro method" and to achieve a more detailed and accurate site-specific (micro) view of future mining, West Virginia Division of Environmental Protection - Technical Applications and Geographic Information Systems Unit (TAGIS) developed a proposal to do detailed mining projections for representative watersheds. A watershed-based analysis will consider more factors - such as environmental feasibility - than could be made under the more regional "macro approach."

TAGIS will analyze the two of the five watersheds being studied by other EIS technical studies. Existing data, such as WVGES GIS information, will be used to estimate remaining coal reserve and likely future mining. Past mining activities and land use changes will be identified using high resolution satellite imagery over discrete time intervals. Sophisticated software will be used to depict land use changes and to convert this information to digital data for inclusion within the GIS. Because of the smaller scale, more accurate projections of future coal production, volume of excess spoil, and potential locations of likely fill disposal will be possible.

Task 4: *Industry Information*

This method projects potential for future mining in the steep slope terrain of Appalachia based on coal resource and reserve information voluntarily provided by the major coal companies and mineral holders in eastern Kentucky, southwestern Virginia, and southern West Virginia.

In 1999, fewer than 100 coal mines account for more than 90 percent of surface coal mine production in eastern Kentucky, southwestern Virginia, and southern West Virginia. In fact, the 30 central Appalachian mines producing more than 500,000 tons of surface mining coal account for about 80% of surface mine production. These mines are controlled by a few large companies.

During several EIS briefings, coal company representatives indicated that they would furnish information on future mining plans to assist with completion of this work plan element. Initial conversations with company officials indicated that the companies are willing to provide certain general coal reserve and resource information. Coal reserves could generally be provided to account for coal production in the near term (generally five years) and somewhat less reliable coal resource information could be provided beyond the five-year time frame.

Using this coal reserve/resource information and professional judgement based on other technical considerations, such as stripping ratios and overburden bulking factors, the extent and location of future mining activities, including excess spoil generation can be estimated for differing scenarios.

Two products will be delivered by this project: 1) a delineation of future mining activities using GIS mapping of remaining coal resources/reserve; and 2) estimation of the possible volume of spoil generated under various scenarios based on mining and reclamation method.

To achieve these objectives, the following sub-tasks are proposed:

Sub-Task A: Company Identification and Contact:

1. Mining companies that collectively account for more than 90% of current surface mining production in WV, KY, and VA will be identified. Publically-available information will be used for this purpose. Major mineral holding entities will also be identified.

2. a. Near-term projections (5-year): The companies identified in sub-task A.1 will be contacted and asked to voluntarily provide coal *reserve* and other information to the study team. Specifically, the team will be asking for map outlines (based on the outcrop of the lowest seam to be surface mined) of demonstrated reserve locations and the estimated recoverable coal tonnage for all tracts of mineral comprising either 50 acres or greater; and/or those areas, regardless of size, containing over 500,000 tons of surface mining reserves. Data provided should be for both permitted and any areas pending to be permitted for mining in the time range of December 2000-December 2005. The companies will also be asked to provide information on:

   - how much of the recoverable reserves is from auger mining
   - average stripping ratio (i.e. the ratio of overburden thickness/coal thickness)
   - bulking factor estimated (swell of the overburden when removed minus shrink of the overburden when replaced and compacted in the mined area)
   - number of seams contributing to the surface-minable reserves
   - the intended mining technique (s)

   b. Far-term projection (5-15 year): The companies identified in sub-task A.1 will be contacted (simultaneously with performance of task 2a) and asked to voluntarily provide coal *resource* and other information to the study team. Specifically, the team will be asking for map outlines of surface-minable resource locations and the estimated coal tonnage for all tracts of mineral comprising either 50 acres or greater; and/or those areas, regardless of size, containing over 500,000 tons of surface mining resources. The companies will also be asked to provide information on any mineral tracts that they control that are envisioned for long-term development during the period December 2005-December 2020, including the relative estimated time frame (e.g., 5, 10-year horizon) for exploring and demonstrating the reserve base.

Estimated Completion Date: December 1, 1999

Sub-Task B: Acquire Company Information:

1. If warranted, companies will be visited by a mining engineer accompanied by geographic information system (GIS) specialist.

2. During these visits, the mining engineer, using best professional judgement, will assess the reliability of the coal reserve/resource information; and the GIS specialist will assess whether the information can be readily be imported into GIS.

3. The mining engineer will also discuss (with company professionals) factors that

influence the minability of a coal resource and other factors that influence spoil generation.

Estimated Completion Date: January 15, 2000

Sub-Task C: Import Data into a GIS:

1. Whenever possible, digital data will be requested from the company. This data will most likely require varying degrees of manipulation so that in may be integrated with all other company information obtained. If at all possible, each map outline (polygon) of distinct coal reserve/resource should be provided along with information on the map projection used, as well as a link to some sort of database file with the appropriate attribute (e.g., volume, recovery, stripping ratio, bulking factor, etc.) for the polygon.

2. If the digital information is not available, hard copies of the information will be converted to digital format. This will be accomplished by either the technical team or through the help of a contractor.

Estimated Completion Date: February 15, 2000

Sub-Task D: Prediction of Excess Spoil Generation:

1. The coal reserve/resource information, combined with assumptions based on accepted industry factors (stripping ratios, bulking factors, recovery range), will be used to predict the excess spoil volume generated from variance from approximate original contour (AOC) and AOC reclamation scenarios.

2. Spoil generated if 60 percent of all reserves/resources mined reclaim to AOC, 20 percent receive an AOC variance, and 10 percent are augered (or mined by thin seam miners).

3. Spoil generated if half of the mines reclaim to AOC, 30 percent receive AOC variances, and 20 percent are augered.

4. Spoil generated if 40 percent of the mines reclaim to AOC, 30 percent receive AOC variances, and 30 percent are augered.

Estimated Completion Date: March 1, 1999

VI. Cost Estimates

Task 1 - Assemble all available literature	In-kind
Task 2: WV Geology GIS Method–Macro Method	$ 60,000
Task 3: WV Geology GIS Method–Micro Method	$ 80,000
Task 4: Coal Industry Information	$ 0

Further information regarding this work plan can be obtained by contacting Mr. Michael K. Robinson of the Office of Surface Mining at (412) 937-2882, or e-mail mrobinso@osmre.gov.